REMARKS

Claims 2-6, 8, 10, 15-23, 25 and 26 are pending in the present application. Claims 4, 10 and 15-23 are withdrawn. Claims 2, 3, 5, 6, 8, 25 and 26 are herein amended. Claims 1, 11, 13, 14 and 24 are herein canceled. No new matter has been presented.

Claims 3 and 26 were amended to recite a substrate made of glass fiber, a coated layer on both sides of said substrate is PTFE and said photocatalyst-containing layer contains FEP. Support for the amendment is in Example 6 of the present specification.

Claim Rejections - 35 U.S.C. § 112

Claims 1-3, 5, 6, 8, 11, 13, 14 and 24-26 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Office Action stated that the limitation "said photocatalyst particle" lacks an antecedent. The Office Action suggested changing "particle contains" to --particles contain--. Claims 2, 3, 25 and 26 have been amended as suggested in the Office Action.

Withdrawal of the rejection under § 112 is requested.

Claim Rejections - 35 U.S.C. § 103

Claims 1-3, 5, 6, 8, 11, 13, 14 and 24-26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over **Yoshinori** (JP 2002-282703) in view of **Taoda** (US 6,180,548) and **Shirakawa** (JP 2002-322369).

Favorable reconsideration is requested.

In the conventional sheet containing photocatalysts, it is necessary to remove the photocatalyst layer 14 and the middle layer 13 by welding breadth d. (Specification, paragraphs 2-8.) The photocatalyst sheets of the present invention are used by mutually thermally welding. The purpose of the present invention is, considering the problems mentioned above, to offer a photocatalyst sheet and the methods of welding and manufacturing the same, in which the resins and rubbers as substrates or photocatalyst-containing layers are not decomposed by photocatalyst particles, to provide easy mutual welding of sheets, and to provide the effect of photo-redox reaction of photocatalysts. (Specification, paragraph 8.)

Among other features, claim 2 recites a substrate made of polyester fiber, a coated layer made of polyvinyl chloride resin coated on both sides of said substrate, and a photocatalyst-containing layer containing polyvinyl chloride resin and acrylic resin.

The photocatalyst sheet of claim 2 is disclosed in Examples 1 to 5 and related comparative Examples 1 to 6. These photocatalyst sheets were evaluated for photocatalytic activity, thermal adhesibility, and mass change ratio by photoxidative decomposition. The measurement results are summarized in Fig. 6 and details are provided in the specification at paragraphs 45-47. The effect of claim 2 of the present invention is follows (see specification, paragraph 10):

The pre-step treatment as in the prior art to remove the photocatalyst layer of welding breadth, and to expose the resin layer on the surface is no longer necessary, thereby welding is quite easy.

Especially in case of thermal adhesion, welding with sufficient welding strength is possible by making the ratio of apatite-coated photocatalyst particles to polyvinyl chloride resin and acrylic resin 10-40 weight %.

Claim 3 recites different materials for the substrate, the coated layer on the substrate and the resin in the photocatalyst-containing layers. Claim 3 recites a substrate made of glass fiber, a coated layer made of polytetrafluoroethylene (PTFE) coated on both sides of the substrate, and a photocatalyst-containing layer containing tetrafluoroethylene-hexa-fluoropropylene (FEP).

The photocatalyst sheet of claim 3 is disclosed in Examples 6 to 10 and related comparative Examples 7. These photocatalyst sheets were evaluated for photocatalytic activity, thermal adhesibility, and the mass change ratio by photoxidative decomposition. The measurement results are summarized in Fig. 7 and detailed evaluation results are described in the specification at paragraphs 48-51. The effect of claim 3 is the same as that of claim 2. In addition, there is another effect when compared to a photocatalyst sheet of Yoshinori as follows.

Yoshinori discloses that the uppermost layer 5 is provided with a layer containing PTFE and photocatalyst powder. However, in order for the sheet to be thermally welded, since, unlike other fluorocarbon resins, melt viscosity is quite high, and photocatalysts are contained, weld intensity for practical use cannot be attained unless heated for an unrealistically long time. Melt viscosity of PTFE is 10^{10} - 10^{12} Pa·s, whereas that of other fluorocarbon resins is 10^{4} - 10^{6} Pa·s.

If photocatalyst sheets of Yoshinori are thermally welded to each other by the same welding condition as the present invention for complete weldability, and the welded part is peeled off at the rate of 50 mm/min then the whole fluorocarbon resin layer made of PTFE is not

completely peeled off from the substrate, and weldability is not good. This is due to incomplete welding of the fluorocarbon resin layer made of PTFE.

Therefore, in the case that a photocatalyst sheet of Yoshinori is used as a film/fabric structure material, there is a problem that the required intensity was not attained, and hence it is not practically used as a film/fabric structure material.

On the other hand, photocatalyst sheets of the present invention can attain good thermal weldability when thermally welded to each other by the same welding condition as above, and the welded part is peeled off at the rate of 50 mm/min, then the whole fluorocarbon resin layer is completely peeled off from a substrate. That is, it was recognized that fluorocarbon resin layers were completely welded, and welding intensity was good for use as a structure material, resulting in the present invention.

(1) Applicants respectfully submit that Yoshinori in view of Taoda and Shirakawa does not teach or suggest:

> wherein said photocatalyst-containing layer contains polyvinyl chloride resin, acrylic resin, and apatite-coated photocatalyst particles having low water solubility
>
> the coating quantity of said apatite coated on said photocatalyst particles is such that the weight loss ratio of the whole of said photocatalyst sheet is 10% or less when ultraviolet light of intensity of 18 mW/cm^2 is irradiated for one hour on the surface of said photocatalyst sheet,
>
> the water contact angle of said photocatalyst sheet surface is 130 degrees or less,
>
> whereby said coated layer can be peeled from said substrate when a pair of said photocatalyst sheets are mutually thermally welded to form a welded part and when said welded part is peeled off by a peeling test at the rate of 50 mm/min

as recited in claims 2 and 25. Yoshinori discloses the use of polyester fiber as the base material. However, Yoshinori does not teach a photocatalyst-containing layer containing polyvinyl chloride resin and acrylic resin.

Yoshinori discloses the photocatalyst-containing layer, which contains silicone resin, coated on one side of 50-micron-thick polyester film in Example 1. (See, English Translation of JP 2002-282703 A, paragraph 28). However, Yoshinori does not disclose the thermal welding of two photocatalyst sheets and their strength of mutually welded photocatalyst sheets.

(2) Applicants respectfully submit that Yoshinori in view of Taoda and Shirakawa does not teach or suggest (in addition to similar features noted above):

> a substrate made of glass fiber;
>
> a coated layer made of polytetrafluoroethylene (PTFE) coated on both sides of said substrate; and
>
> a photocatalyst-containing layer coated on at least one side of said coated layer,
>
> wherein said photocatalyst-containing layer contains tetrafluoroethylene-hexa-fluoropropylene copolymer (FEP) and apatite-coated photocatalyst particles having low water solubility

as recited in claims 3 and 26.

Yoshinori discloses to use a textile structure such as a woven structure consisting of glass fiber. However, Yoshinori does not teach a combination of PTFE coated glass fiber and photocatalyst-containing layer containing FEP.

For at least the foregoing reasons, claims 2, 3, 5, 6, 8, 25 and 26 are patentable over the cited references. Accordingly, withdrawal of the rejection of claims 2, 3, 5, 6, 8, 25 and 26 is hereby solicited.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP

/Andrew G. Melick/

Andrew G. Melick
Attorney for Applicants
Registration No. 56,868
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

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